

review: p364 problems 1, 4, 11, 13, 24, 26, 28, p388 prob. 2, 6, 11, 13, 18 bonus 17

go over homework:

eg. A 12.0 cm pen is in front of a lens. Determine the size and location of the image if

a) the pen is 5.0 cm from a convex lens
focal length 3.0 cm

$$1/f = 1/d_o + 1/d_i$$

$$1/3 = 1/5 + 1/d_i$$

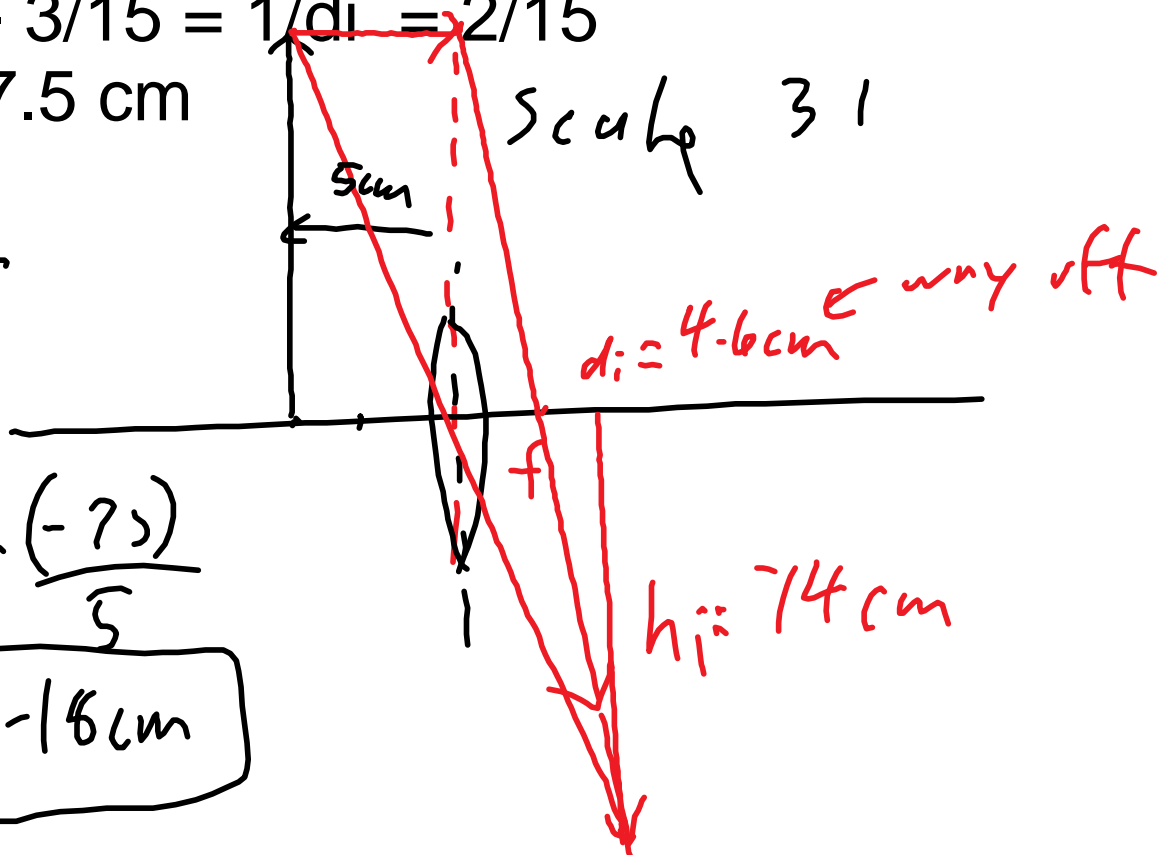
$$5/15 - 3/15 = 1/d_i = 2/15$$

$$d_i = 7.5 \text{ cm}$$

$$\frac{h_i}{h_o} = -\frac{d_i}{d_o}$$

$$h_i = 12 \left(\frac{-7.5}{5} \right)$$

$$h_i = -18 \text{ cm}$$



b) the pen is 5.0 cm from a convex lens

b) the pen is 5.0 cm from a convex lens
focal length 8.0 cm

$$1/f = 1/d_o + 1/d_i$$

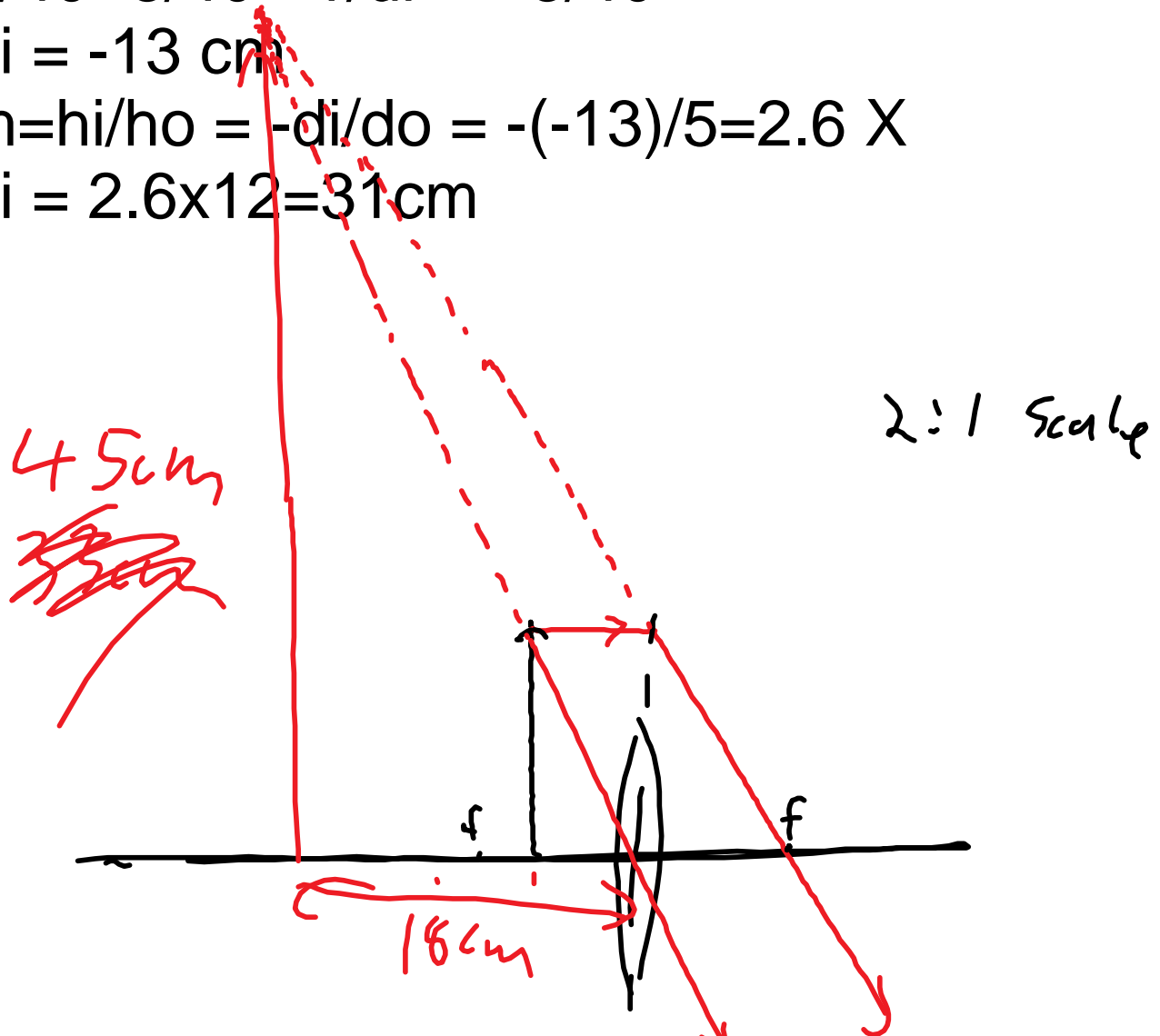
$$1/8 = 1/5 + 1/d_i$$

$$5/40 - 8/40 = 1/d_i = -3/40$$

$$d_i = -13 \text{ cm}$$

$$m = h_i/h_o = -d_i/d_o = -(-13)/5 = 2.6 \times$$

$$h_i = 2.6 \times 12 = 31 \text{ cm}$$



c) the pen is 5.0 cm from a concave lens
focal length -8.0 cm

$$1/f = 1/d_o + 1/d_i$$

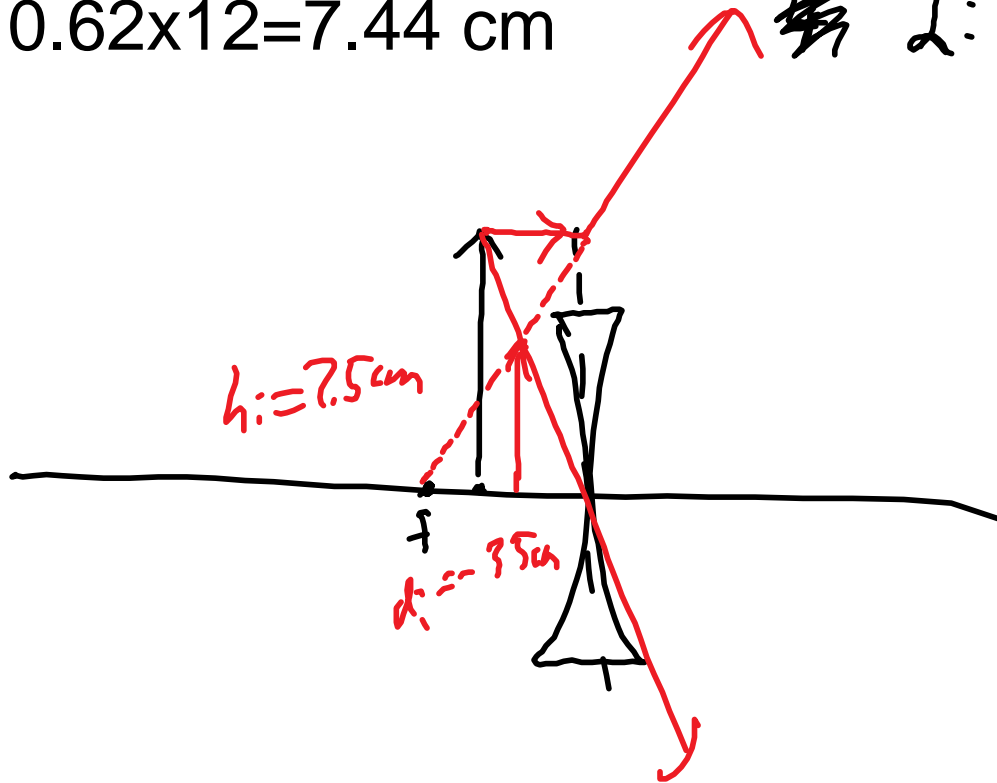
$$1/-8 = 1/5 + 1/d_i$$

$$-5/40 - 8/40 = 1/d_i = -13/40$$

$$d_i = -40/13 = -3.1 \text{ cm}$$

$$m = h_i/h_o = -d_i/d_o = -(-3.1)/5 = 0.62 \quad X$$

$$h_i = 0.62 \times 12 = 7.44 \text{ cm}$$



solve using a scale ray diagram and the equations

$$1/f = 1/d_o + 1/d_i \quad m = h_i/h_o = -d_i/d_o$$

p377-383 problems 9-20

review: p364 problems 1, 4, 11, 13, 24, 26, 28, p388 prob. 2, 6, 11, 13, 18

bonus 17

eg. A 4.0 cm eraser is in front of a lens.
Determine the size and location of the image if

a) the eraser is 5.0 cm from a convex lens focal length 3.0 cm

$$1/f = 1/d_o + 1/d_i$$

$$1/3 = 1/5 + 1/d_i$$

$$5/15 = 3/15 + 1/d_i$$

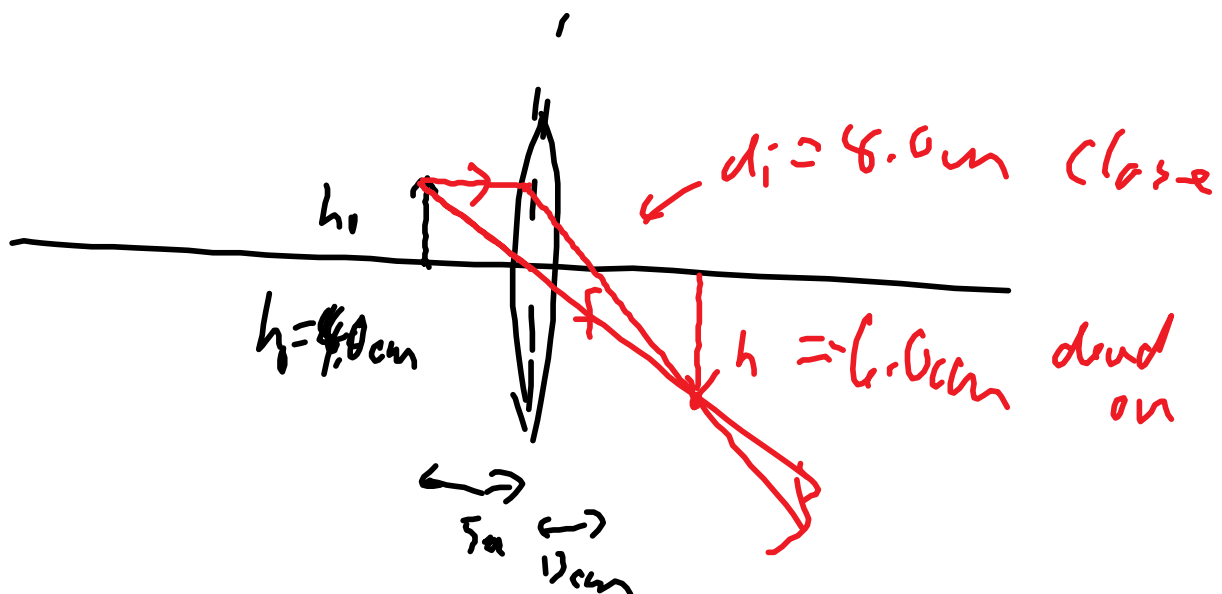
$$2/15 = 1/d_i \quad d_i = 15/2$$

$$d_i = 7.5 \text{ cm}$$

$$m = h_i/h_o = -d_i/d_o = -7.5/5 = -1.5 \times$$

$$h_i = -1.5 \times 4 = -6.0 \text{ cm}$$

Scale ~~1:1~~ 1:1



b) the eraser is 5.0 cm from a convex lens focal length 8.0 cm

$$1/f = 1/d_o + 1/d_i$$

$$1/8 = 1/5 + 1/d_i$$

$$5/40 = 8/40 + 1/d_i$$

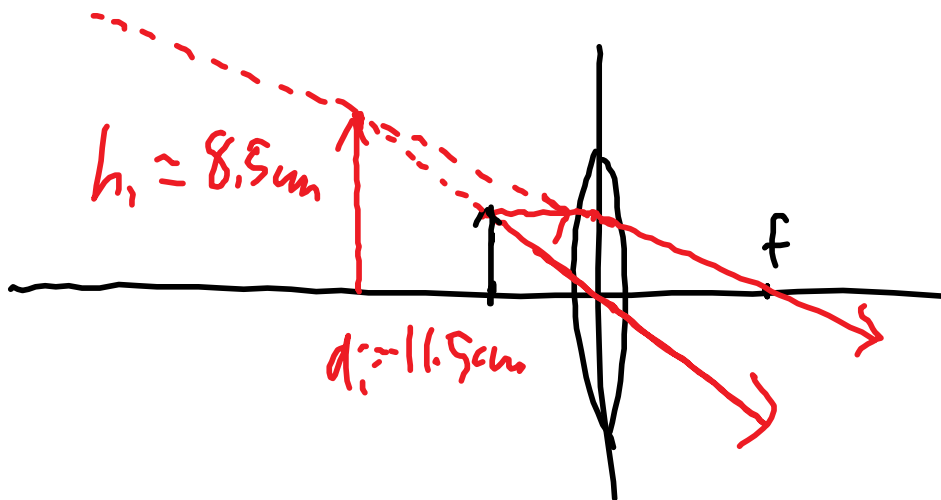
$$-3/40 = 1/d_i \quad d_i = 40/3 = 13.3333$$

$$d_i = \underline{-13 \text{ cm}}$$

$$m = h_i/h_o = -d_i/d_o = -(-13)/5 = 2.6 \times$$

$$h_i = 2.6 \times 4 = \underline{10.4 \text{ cm}}$$

2:1



c) the eraser is 5.0 cm from a concave lens focal length ~~8.0~~ cm

$$1/f = 1/d_o + 1/d_i$$

$$1/-8 = 1/5 + 1/d_i$$

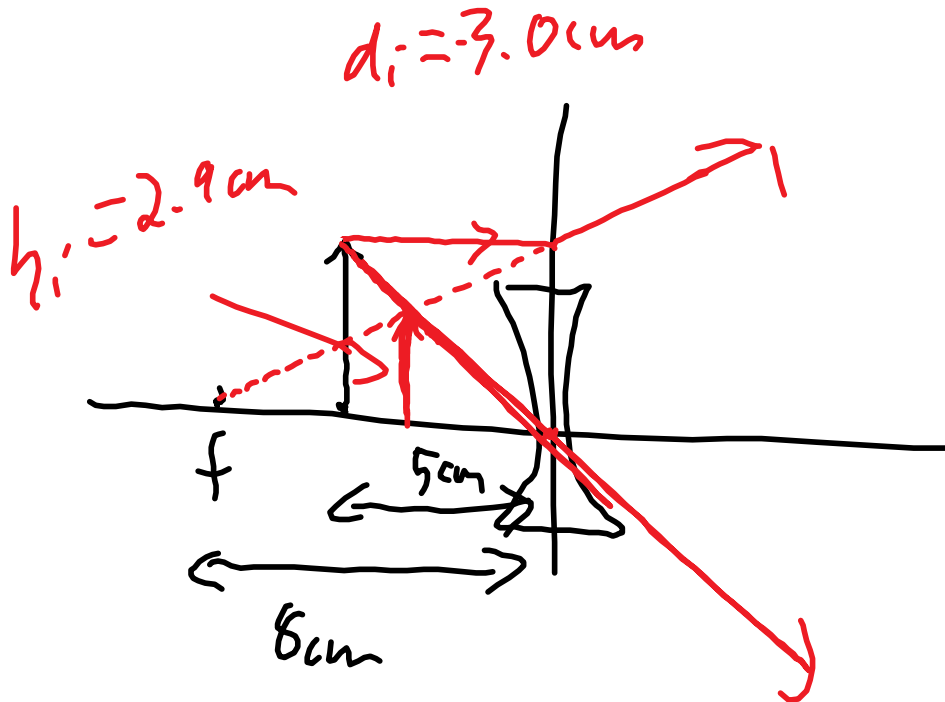
$$-5/40 = 8/40 + 1/d_i$$

$$-13/40 = 1/d_i \quad d_i = 40/13 = 3.0769$$

$$d_i = -3.1 \text{ cm}$$

$$m = h_i/h_o = -d_i/d_o = -(-3.1)/5 = 0.62 \times$$

$$h_i = 0.62 \times 4 = 2.48 \text{ cm} \quad 4 \text{ cm}$$



solve using a scale ray diagram and the equations

$$1/f = 1/d_o + 1/d_i \quad m = h_i/h_o = -d_i/d_o$$

p377-383 problems 9-20

review: p364 problems 1, 4, 11, 13, 24, 26, 28 p388 prob. 2, 6, 11, 13, 18
bonus 17

